

# RESERVE COPY

## PATENT SPECIFICATION



Convention Date (Sweden): May 11, 1937.

518.066

Application Date (In United Kingdom): May 11, 1938. No. 14032/38.

Complete Specification Accepted: Feb. 16, 1940.

### COMPLETE SPECIFICATION

#### Deckle Arrangement for Machines Forming Thick Sheets from Pulp

We, AKTIEBOLAGET SVENSKA MASKIN-  
VERKEN, a Swedish Company, of  
Södertälje, Sweden, do hereby declare the  
nature of this invention and in what  
5 manner the same is to be performed, to be  
particularly described and ascertained in  
and by the following statement:—

In machines for forming thick sheets  
from pulp having an endless wire for  
10 such purposes as, for instance, the manu-  
facture of wall-board, a deckle arrange-  
ment is required permitting the advance-  
ment in the machine of a pulp layer of  
considerable thickness, which in the  
15 manufacture of board may amount to  
400 mm.

The customary equipment in paper  
making machines with deckle straps  
extending over deckle pulleys on  
20 horizontal shafts is for practical reasons  
not serviceable for this purpose, inasmuch  
as deckle straps and pulleys of too large  
dimensions would then be required.

Instead, the deckle would be made with  
25 stationary lateral boards or plates of the  
requisite height, which arrangement  
would involve certain difficulties, how-  
ever, in the first place by the pulp sticking  
to the boards so as to damage the edge of  
30 the sheet and, secondly, for the reason  
that the seal between the stationary board  
or plate and the running wire would not  
be effective. It would be possible to make  
it effective, it is true, but it would then  
35 damage the wire. However, use has also  
been made of deckle straps running  
over deckle pulleys on vertical shafts, and  
in this way a movable lateral wall of the  
desirable height would be obtained, but  
40 such straps are expensive and also require  
expensive guiding means for the  
advancing flight of the strap, as well as  
guiding and supporting means for the  
return flight.

45 A board-making machine of this type  
and of ordinary size is thus fitted with 110  
adjustable supporting and guiding  
rollers. In connection with straps of a  
greater height, this number must be  
50 further increased, inasmuch as the strap  
is caused to bulge between the supporting  
rollers by reason of the increased hydro-  
static pressure, so that unsealed places

will be produced between the strap and  
the wire.

The present invention has for its object  
to obviate these difficulties. According to  
the invention the deckle arrangement for  
machines forming thick sheets from pulp  
using an endless wire, consisting of two  
60 lateral boards or plates extending to the  
whole height of the pulp layer and of  
deckle straps bearing on the wire, is  
characterised in that a movement is  
imparted to the boards or plates, in-  
creasing the relative velocity between  
65 the latter and the pulp.

In the use of short-fibrous pulp, and in  
connection with pulp with sticky admix-  
tures, where the pulp is apt to adhere  
to a stationary board, the fact has been  
made use of that the coefficient of friction  
and the tendency toward sticking are  
diminished with an increasing relative  
velocity between two bodies. For this  
75 reason, a reciprocating movement has  
been imparted to the board, in the plane  
thereof so as to eliminate the disadvan-  
tage of a stationary board, involving  
damage to the edge of the sheet.

The strap serving as a sealing means is  
arranged on the outside of the board, and  
the portion of the board bearing on the  
strap is made thin and preferably from  
rubber so as to plially follow any bulges  
85 made by the strap between two supporting  
rollers. For the advancing flight of the  
strap, a few supports or supporting  
rollers may be arranged to prevent the  
strap from being pressed outwardly.

The deckle strap may be arranged so as  
to run on deckle pulleys with vertical  
shafts or on deckle pulleys with hori-  
zontal shafts. The latter arrangement  
involves the advantage that the deckle  
95 pulleys may be driven in a more simple  
manner from the driving shafts of the  
machine rollers.

The invention is illustrated by way of  
example in the accompanying drawing, 100  
in which Fig. 1 is an elevation of a  
machine for forming thick sheets from  
pulp, while Fig. 2 shows the same  
machine in a plan view. Fig. 3 shows a  
part cross section of the machine on line  
105 A—B in Fig. 1. Fig. 4 shows a detail

view of a lateral board by way of diagrammatic representation, said lateral board being arranged beside a deckle strap running about rollers with vertical axes, the adjacent portion of the machine wire being also illustrated. Figs. 5, 6, 7 and 8 show various embodiments of a deckle strap running about horizontal shafts while being guided on the corresponding deckle strap pulley. Finally, Figs. 9 and 10 show different combinations of the guide board and the deckle strap.

In the drawing, 1 designates a machine wire running over a breast roller 2 and between two pressing rollers 3 and over guide rollers 4. 5 denotes register rollers. 6 are suction boxes. On the inlet side, there is arranged breast board 7 with breast shields 8. The deckle straps 9 bearing on the outer borders of the wire are arranged to run over deckle pulleys 10 and 11. 12 designates a supporting roller for the deckle strap 9. The deckle strap 9 may only constitute a portion of the side of that channel wherein the pulp layer is to be advanced, and for this reason a board 13, preferably thin, is arranged, according to the invention, beside the deckle strap, said board being high enough to afford a sufficient lateral support for the pulp layer during the feeding thereof. As will be seen from Fig. 1, the wire 1 has its intake opening located on a lower level than that of the outtake opening, while the upper edge of the board 13 extends substantially horizontally. Thus the channel will diminish in height from the inlet side to the outlet side thereof.

The deckle pulleys 10, 11 run on shafts 25, 26, while the breast roller 2 runs on the shaft 27 and the press rollers 3 on shafts 28, 29.

The previously mentioned movement, which is imparted to the board 13 by reason of the nature of the pulp, may either be a reciprocating movement in a direction approximately in parallel to the average direction of the upper edge of the wire, the boards being then arranged to move horizontally or approximately so, or, the movement may take place in a manner such that a certain point of the board moves in a circular, elliptical or other closed path or along a portion of such a path or along an open line, such as a parabola, any point of the board obtaining then preferably an oscillatory movement.

To impart the movement to the boards 13, the arrangement illustrated in the drawing may be made use of. This arrangement involves that the boards are united with or secured to abutments or

the like 20, 21, 22 extending outwardly in a lateral direction, said abutments or the like being rigidly connected with a board holder 14, in which, in turn, runs in a chute or on arms 23 or over rollers, which are fixedly arranged or mounted on lateral frames 15 which, in accordance with the construction illustrated, may also carry the aforesaid press rollers, supporting rollers and so forth. The drawing shows how a movement is imparted to the board holder 14 through an eccentric rod 16 secured at the one end thereof to the holder 14 by means of a pin 24 and running at the other end thereof on a shaft 18 by means of an eccentric 17. In the case where the movement of the rollers is independent of one another two separate drives are arranged, for instance of the eccentric type above described. 19 denotes lateral members on the inlet side, the same being secured to the breast shields 8 and covering the ends of the boards 13, so that a sealing effect against the board is obtained by the pressure of the pulp.

It is of the utmost importance that the board 13 presses against the deckle strap 9. In order to render this sealing means effective, it is necessary that the deckle strap is guided on its deckle pulleys or by means of supports or supporting rollers suitably spaced along the advancing flight of the strap. Such guiding may be effected by the deckle pulley being provided with grooves 10a, 10c, 10d and/or elevations 10b, 10e, 10f, and by the deckle strap being provided with elevations 9a, 9c, 9d and grooves 9b, 9e, 9f, respectively fitting thereto, as will appear from Figures 5 and 6, where the index designations a and b respectively have been made use of. In accordance with Figure 7, the elevation and the recess respectively is formed on a curved line, such as a circular arc, while in Figure 8 it is shaped on an angular line. The index designations in Figures 7 and 8 are c and d respectively.

The distance between the wire and the lower portion of the board 13 may be greater or smaller. In Figure 3, where this distance is denoted by a, it is comparatively small, but obviously, the distance is dependent on the movement imparted to the boards and the height of the deckle strap. In Figure 4, the distance between the board 13 and the wire 1 is relatively great, which is facilitated, however, by the use of a deckle strap running about vertical rollers 31 on shafts 32.

As will be seen from Figure 9, the board 13 may be shaped in section on a double angular line, so that the operative

70

75

80

85

90

95

100

105

110

115

120

125

130

portion of the board 13f will be on a level with the deckle strap 9f. The inwardly facing portion of the board 13f<sub>i</sub> runs in a groove 9f<sub>i</sub> in the upper border of the deckle strap. The board 13f is made from thin material, but may, as shown in Figure 10, be reinforced by a solid or recessed wall 13f<sub>n</sub>, the latter arrangement being suitable in case the movement is to be transmitted directly to the board, without the use of any board holder. The board can also be stiffened by other means such as attachments or springs of suitable type. Otherwise, the movement of the board may be effected by the same being suspended in arms so as to obtain a reciprocating oscillatory motion.

The deckle strap may obviously run on pulleys without any grooves, and may instead be guided on the one or on both sides by guide rails, guide rollers or the like.

The invention may be combined with parts or arrangements or details known from other types of machines for forming thick sheets from pulp, with or without deckle means.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Deckle arrangement for machines forming thick sheets from pulp using an endless wire, consisting of two lateral boards or plates, extending to the whole height of the pulp layer and of deckle straps bearing on the wire, characterised in that a movement is imparted to the boards or plates, increasing the relative velocity between the latter and the pulp.

2. Arrangement according to Claim 1, wherein the inlet side of the wire is on a lower level than that of the outlet side, characterised in that the boards or plates follow the wire on their lower side at a certain distance which at least permits the movement of the boards or plates, without coming into contact with the wire.

3. Arrangement according to Claim 1 or 2, characterised in that the boards or plates on either side of the pulp layer are arranged to move independently of one another.

4. Arrangement according to Claim 1, 2 or 3, characterised in that the boards or plates are arranged to perform a reciprocating movement in a direction approximately parallel to the average direction of the wire.

5. Arrangement according to Claim 1, 2 or 3, characterised in that the boards or plates are arranged to move in a horizontal or approximately horizontal direction.

6. Arrangement according to Claim 1, 2 or 3, characterised in that the boards or plates are arranged to perform a movement such that a certain point thereof moves on a circular line, ellipse or other closed line.

7. Arrangement according to claim 1, 2, or 3 characterised in that the boards or plates are arranged to perform a movement such that a certain point thereof moves on an open curved line, such as a parabola.

8. Arrangement according to Claims 1—7 characterised in that the movement is so adapted that a certain point is caused to perform an oscillatory movement, preferably on a certain portion of a line as set forth in Claim 6.

9. Arrangement according to Claims 1—8, characterised in that the boards or plates are suspended at or positioned entirely or in part, to the side of the respective deckle strap and/or are arranged within the free space thereof with a holder provided with a suspension means or the like, the desired movement of the boards or plates being imparted to said holder.

10. Arrangement according to Claim 10, characterised in that the holder is arranged to move in a chute or over abutments, supporting arms or the like and/or over rollers arranged on or beside lateral frames or the like.

11. Arrangement to ensure the sealing between a deckle strap arranged over horizontally mounted rollers in the arrangement according to Claims 1—11, characterised in that the deckle straps are arranged to be guided in their movements.

12. Arrangement according to Claim 12, characterised in that the guidance is effected by guide rails, guide rollers or the like provided outside the deckle strap.

13. Arrangement according to Claim 12, characterised in that the guidance is arranged to take place by a groove or elevation provided in the deckle straps and fitting to an elevation and groove respectively in the deckle pulleys.

14. Arrangement according to Claim 12, characterised in that the lower edge of the board or plate is provided with a comparatively thin tongue of flexible, relatively soft material, such as rubber, which is pressed by the hydrostatic pressure of the pulp against the deckle strap so as to seal thereagainst.

15. Arrangement according to Claim 14, characterised in that the groove and the elevation are shaped on a circular line or the like.

16. Arrangement according to Claim 14, characterised in that the groove and the elevation are shaped on an angular line.

17. Arrangement according to Claim 14, characterised in that the groove and the elevation respectively are rectangular.

18. Arrangement according to the 5 preceding claims, characterised in that the boards or plates are adapted at the bottom to run in grooves of the deckle strap, in a manner such that the inside of the board or plate and the inside of the 10 deckle strap will be located in approximately the same vertical or more or less oblique plane.

19. Arrangement according to Claim

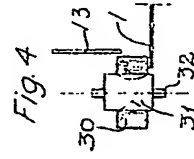
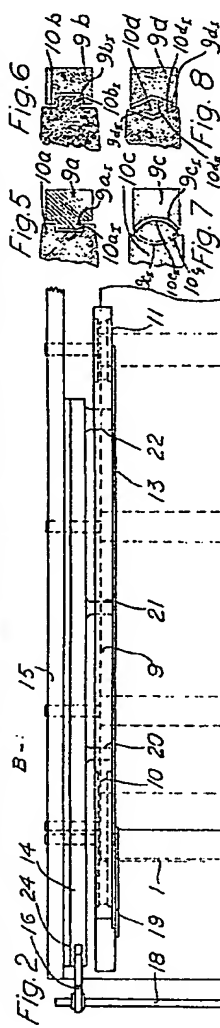
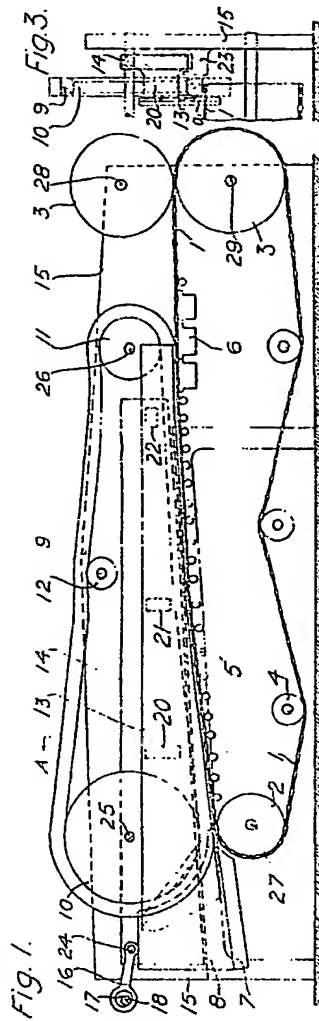
18, characterised in that the board or plate is stiffened above the deckle strap 15 by a recessed wall or other attachment, spring or the like.

20. Arrangement according to the preceding applicable claims, characterised in that the boards or plates are so arranged 20 or adapted to run directly in guides or the like as to permit of being actuated directly by the members producing the movement.

Dated this 10th day of May, 1938.

MARKS & CLERK.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1940.



[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

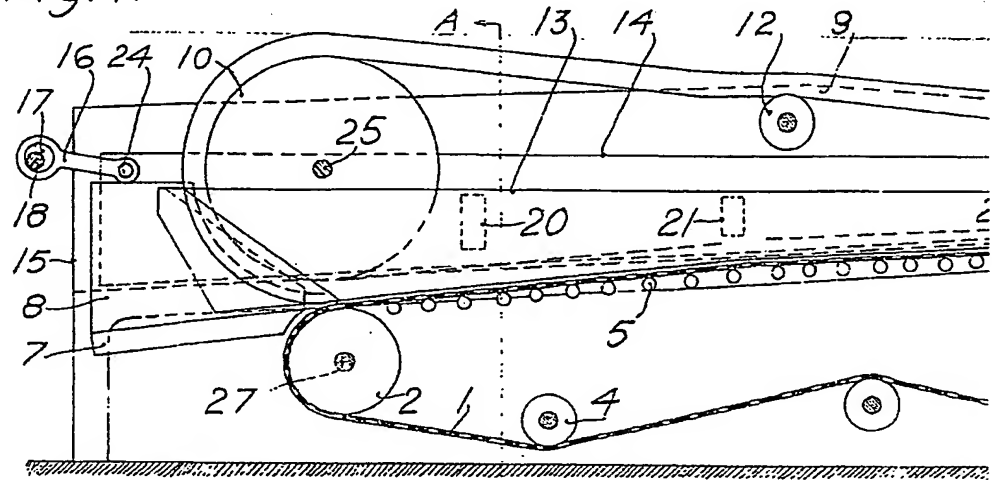


Fig. 2.

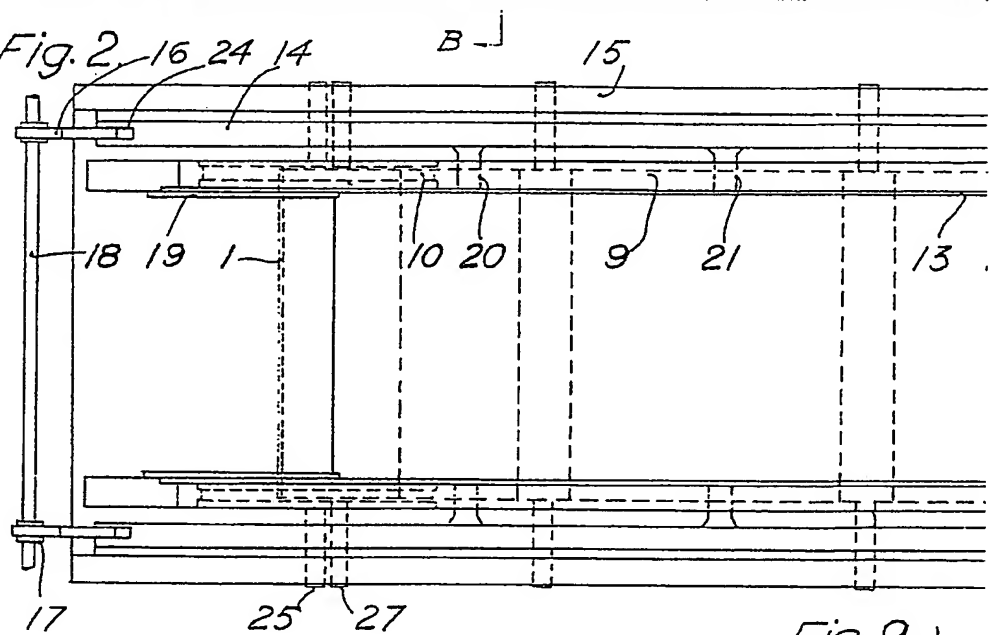


Fig 9

